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THE BALTIC FLEET AND THE NORTHEAST PASSAGE.

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I HAVE been asked by the Editor of the NORTH AMERICAN REVIEW to give my views as to the practicability of the use of the Northeast Passage through the Arctic Ocean by the Russian fleet in transit from the Baltic to the Pacific. In discussing this matter, I prefer to disregard the bearing which military expediency may have upon it, and to consider it solely from the standpoint of an Arctic explorer who, for almost two years, ice-beset in the "Jeannette," drifted to and fro over perhaps the most exposed and dangerous portion of this possible route. Russia's Baltic fleet, available for service in Asiatic waters, consists, according to recent reports, of from fifteen to twenty ships of large tonnage, the majority of which are battle-ships and armored cruisers. Broadly speaking, then, the question is simply whether heavy armored vessels of high power can face the northern ice successfully at this season and round Asia in safety.

The memorable achievement of Professor Nordenskjöld furnishes, in large part, an answer to this question. In the "Vega," a slow steam-whaler of but 300 tons burden, he left Tromsøe in July, 1878, and, late in September, put into Kuliuchin Bay, but little over a hundred miles from Bering Strait, where, blocked by

closely packed ice, he was forced to winter. His somewhat late start, the slow speed and low power of his vessel, and an unfavorable season combined to prevent his immediate passage of the strait, since whalers frequently traverse the seas near where he wintered for a month or more after his progress was stopped.

Before Nordenskjöld's day, however, a long line of Arctic navigators and explorers of many nations, with a daring equalled only by the toil and suffering they endured, had mapped, rudely, it is true, the shore-line from North Cape to Bering Strait, and, by their united efforts extending from the ninth century onward had practically completed, although in links parted by years and distance, the coast-survey of the Northeast Passage.

England, seeking maritime commerce, despatched, in 1553, the first important expedition under Sir Hugh Willoughby, one of whose captains, Richard Chancellor, reached a port which is now Archangel on the White Sea. In 1580, the Englishmen, Pet and Jackman, were the first sailors from the west to navigate the ice-blocked Kara Sea. Holland, looking for a way to the Indies which Spain and Portugal could not imperil, sent out in 1594, under the heroic Barents, the first of a number of expeditions fated, like those of England, to failure in their main purpose, but each adding its share to the world's knowledge of Arctic seas and shores. The English and Dutch efforts were supplemented and followed by those of the Russians, which, although begun for hunting purposes, were turned later toward exploration simply. By the middle of the seventeenth century, three-fourths or more of the entire northern shore had been traversed. Bering Strait was first passed in 1646, and Cape Chelyuskin, the Great North Cape of Asia, was discovered in 1742. For nearly twenty years previous to the latter date, an extended survey of much of the coast-line had been carried on by Russia.

In modern years, in addition to the "Vega's" cruise, Nordenskjöld made two preliminary exploring runs, one in a vessel of 70 tons, to the mouth of the Yenisei; Captain Joseph Wiggins has steamed successfully a number of times to the same destination; and the essays of commerce in the Arctic have been frequent from the West. With this knowledge and from my own experience in these seas, I do not hesitate to assert that, when there is need to face its possible dangers, the Northeast Passage must be regarded as a practicable route for a determined and able commander.

Turning to the map, let us glance at the probable course which a fleet would follow in this transit. After leaving the Baltic and rounding North Cape, the ships would proceed through Kara Strait, between Nova Zembla and the continent, to the north of White Island, and make directly for Cape Chelyuskin. Then, passing the cape and hugging the coast-line, the fleet should steer south of the New Siberia Islands and Wrangel Land to Cape Serdze-Kamen, East Cape, and Bering Strait. Thence, through the strait to Petropavlovsk in Kamchatka, where the ships could refit before further progress to the south.

The most practicable course is that near the coast-line, wherever possible. My reason for so thinking is that the prevailing winds frequently drive the ice off the coast, leaving a channel inshore. In the Kara Sea, the first obstruction from ice may be met; but the "Vega" found the strait free and the other voyages of Nordenskjöld and Wiggins extended to the Yenisei, eastward of these waters. Again, during July and August, whalers go as far north as the Great Ice Cape of Nova Zembla, near which Barents wintered and off which he died.

A course between the New Siberia Islands and the coast is preferable, because the water is deeper there than it is between the islands of the group. In fact, there are no channels between these islands. Again, from June until October, there is nearly always open water south of the islands, since the ice is held off by the wind. The gap, nearly forty degrees of latitude in length, between the New Siberia Islands and Wrangel Land, is a stretch of sea in which the ice crowds down on the land; but there is deep water up to the shore, and, with each varying wind or tide, the ice may close in or leave within an hour or a day. Nordenskjöld was obliged to winter on the coast because the ice had pressed in near Cape Serdze-Kamen. It is altogether possible that a speedier ship of higher power than the "Vega" would have been able to push, not jam, her way through. Had he rounded this cape, he could have passed East Cape and proceeded through the open sea.

Until the Kara Strait is reached, no difficulties will be encountered which would not be met in ordinary cruising in high latitudes. The Arctic voyage practically begins at this point; and, in traversing the distance to East Cape, the dangers which might imperil the fleet are the persistent fog which prevails in the Arctic during the summer season, the illy charted waters through which

the ships must pass, and, finally, and most important of all, the ever-present ice.

Fogs and the lack of absolutely accurate charts will both necessitate low speed and the frequent use of the sounding-lead. It will be remembered, however, that our ignorance of this coast-line is relative only. The many efforts of many navigators of the past to which I have referred, have resulted in charts which give information, quite sufficient at least for times of stress, as to the depth of water, currents, and winds along the whole shore to East Cape. In this, I speak with extended knowledge, shadowed by some mournful memories, for I was the cartographer of the lost "Jeannette"; and, for many weary months, my companions and I studied eagerly the characteristics of that coast-line in our search for a safe line of retreat when, as we foresaw, our ship, ice-beset and leaking, must some day sink.

A further fact which will tend to reduce the possible danger of grounding is that the bottom of practically the whole of the Arctic basin north of Siberia is of sand or silt, owing to the discharge from the large rivers with many mouths which find outlet there. Hence, a rocky and irregular bottom is seldom met, although sand-banks and shoals are numerous. If the ships should take the ground at low speed, they must, therefore, in all probability, back off easily, with assistance from their consorts if necessary. These facts and the smooth sea which they would meet during the Arctic journey bring the likelihood of grounding within wholly practicable limits.

The question of the ice-obstruction is, in my view, the only possible danger of much importance. I have already noted the regions in which it is most likely to be met and the chances of freedom even there. It should be remembered also that a large, high-powered armored ship, having weight, momentum, and speed when required, will push her way with ease through the "pack" or broken ice which might bar wholly the progress of such a relatively small and weak craft as the "Vega" was. The pack will not trouble armorclads or the protected-cruisers and colliers which accompany them. The real ice-peril lies in meeting the solid "floe," which, driven by the wind, might force the ship bodily on a shoal or ashore. The meeting is quite possible, but I have already pointed out the favoring circumstances in the character of the bottom, the nature of the prevailing winds, and the occa-

sional shelter of the islands. Under average circumstances, the rest may well be left, and safely, to the seamanship of able and determined men. There is the additional possibility of being caught between two colliding floes, but this is not probable and can be avoided by skilful and careful ice-navigation. While I have raised the ghosts of these possible perils, I do not believe that they are substantial probabilities. Did not Norden skjöld, in his small, slow craft, traverse the Northeast Passage in entire safety? He was accompanied also, for much of the distance, by the "Lena," a mere iron-tank steamer, which passed on unscathed, and, if not since lost, is still running, in the summer time, on the Lena River carrying freight and passengers. Again, on the Greely Relief Expedition, commanded by Captain (now Rear-Admiral) Schley, of which I was a member, we took with us as a collier a common iron tramp-steamer, the "Loch Garry," which, without stiffening timbers or outside protection, forced her way through the ice-blocked seas unhurt, as far north as Upernavik. As a whole, the ice-question, while problematical, has much to minimize its dangers.

The ships of a war-fleet, such as is under discussion, are armored to four feet or more below the water-line, stiffened from end to end by the protective deck, and have massive bows fitted for attack by ramming. They are, therefore, far more capable than the ordinary merchant steamer of pushing a way through the pack and of resisting the side-pressure of opposing floes. Again, such vessels as have the extended ram-bow of French type are equipped with the best possible weapon for attack on the ice, by underrunning it and allowing it to break of its own weight. As an additional precaution, the bows of all ships should be strengthened with heavy timbers; the latter, laid athwartships, should be used to stiffen the hull, and there should be a removable iron-plated timber-sheathing, extending, at the water-line, from the bows to amidships. This sheathing and the timbers could be removed to St. Lawrence Bay below East Cape, before going south to Petropavlovsk. These precautions must be regarded as extraordinary, if the passage be made in the open summer season. In addition to the other instances which I have cited of ordinary vessels cruising at this time in these waters in safety, I recall that Mr. Oscar Dickson and other northern merchants started an experimental line of steamers to carry grain from the mouth of the

Yenisei River to Europe. The enterprise failed, not because of the destruction of the ships but because it was not a commercial success. There is every probability, therefore, that men-of-war could find their way with ease through the loose ice-pack, and, if heavy floes are met, with their strong hulls and powerful machinery they should be able to push from their path floes which would stop a weaker vessel.

Coal could not be obtained at any point along the Northeast Passage, unless, as is very improbable, it could be sent on flat boats down the Yenisei or Obi rivers. On the other hand, all of the ships of the Baltic fleet have, or should have, fuel in their bunkers sufficient for a steaming radius of 5,000 miles, especially as, for reasons given previously, the speed must be low. Sufficient for an additional 1,000 miles can also be carried on their decks and in their fire-rooms, since the ships will not become topheavy as there are no rolling seas on this coast, calm water prevailing until the Great East Cape is rounded, by which time the ships would be lightened and ready to proceed in the open sea. During the Arctic voyage, therefore, such deck-loads would have no injurious effect upon the stability; they would simply increase the draught.

To provide for all emergencies with regard to fuel, a squadron of colliers should accompany the fleet, these tenders being sufficient in number to allow for the possible destruction of a fair percentage of these relatively weak vessels by the ice-floes. The colliers should discharge their cargoes at different points along the route. The first division of these tenders, for example, could transfer their coal to the fleet at the Kara Strait and then return to Kronstadt; the second could unload at Cape Chelyuskin, proceed to the White Sea, refit, and steam westward to a home port; a third could discharge at the Great East Cape and then make Unalaska or St. Michaels in Norton Sound; and the remaining colliers with full loads could accompany the fleet to Petropavlovsk.

These tenders, not being constructed for ice-navigation, should be strengthened, as has been described previously. They should have wooden sheathing on the bows and along the sides to amidships for four feet down from the water-line, and transverse stiffening timbers should be fitted in the bunkers. As I have stated, this is an unusual, and in a favorable season it would be an unnecessary, precaution. Our collier in the Greely Relief Ex-

pedition did not require it, and the experience of the "Lena" and the "Frazier," which accompanied Nordenskjöld through a portion of his journey, was similar.

It has been suggested, in discussions of the possible transit of the Arctic by the Russian fleet, that the ice-breaker "Ermack" should be able to force a passage for the war-ships. I doubt the practicability of this, since her coal-capacity is probably small. Of course, no vessel yet constructed by man will cut a channel through heavy floe ice. In lesser work, however, the "Ermack," if she could carry coal enough for a run of reasonable length, might be of much assistance to the expedition.*

I have gone over briefly the main facts bearing on the possible transit of the Northeast Passage by a fleet of war-ships. In this discussion, I have not viewed the question either from a military or an academic standpoint, but from that of the long and somewhat bitter experience which I met in actual service in the Arctic, especially in waters which such a fleet would traverse. From my knowledge of those seas, I firmly believe in the practicability of such a voyage, under the conditions I have recited. As to the military advisability or necessity of such an effort, I say nothing. The early failures to complete the Northeast Passage were but the attempts of heavy, slow, and ill-equipped sailing vessels. There seems now no doubt of the transit in the summer season by strong, high-powered steamships and men-of-war. In facing its possible dangers, a determined commander would find inspiration not only in the national need of his service, but in the memory of the fidelity and fortitude of men like Willoughby, Chancellor, Barents, Bering, Nordenskjöld, and a long line of explorers, whose names shine brilliantly on every page of the history of the Northeast Passage.

GEORGE WALLACE MELVILLE.

* The "Ermack" is 335 feet long, 71 feet beam, and, with coal and stores on board, is about 8,000 tons displacement.